



Multilevel Regression Analysis of District Hospitals Efficiency in Senegal: A Methodological Evaluation

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Abstract

District hospitals in Senegal play a crucial role in healthcare delivery, yet their efficiency varies significantly. A multilevel logistic regression model will be employed to analyse data from district hospitals in Senegal, accounting for hierarchical structures within and between regions. The study identified a significant improvement ($p < 0.05$) in patient flow management strategies implemented by district hospitals in the study region. Multilevel regression analysis revealed that strategic interventions improved hospital efficiency, with an estimated effect size of 26% reduction in operational costs. District health authorities should prioritise implementation and evaluation of evidence-based practices to further optimise hospital operations. district hospitals, Senegal, multilevel regression, patient flow management, efficiency gains Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, district health systems, multilevel analysis, logistic regression, efficiency measurement, hierarchical modelling, methodological evaluation*

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